Instructors:

Carol Dieckmann, Professor of Molecular and Cellular Biology
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Life Sciences South 427
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Teaching Assistants:

Telsa Mittelmeier, PhD Staff Scientist
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Kathleen Lasick, PhD MCB student
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Office hour: 11 AM Monday LSS 2nd floor lobby
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Office hour: 11 AM Wednesday LSS 4th floor lobby

Jacob Cecil, PhD MCB student
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Office hour: Noon Monday LSS 4th floor lobby

Preceptors:
Thomas Rychener, BS MCB student
Sneha Srinivasan, BS MCB student
Amanda Ruelas, BS MCB student

Time: MWF 2 PM and F 3 PM or 4 PM

Locations: Education 211 for MWF 2 PM classes.
Life Sciences South LSS 240, LSS 340, or LSS 440 on Fridays at 3 PM or 4 PM. Please attend your assigned classroom/time.

Units: 3 units class + 1 unit discussion = 4 total units
5 units if enrolled in Honors. Extra Honors 50 minutes class is 3 PM Wednesdays LSS 240.

Overall course objectives:
The course encompasses foundational material for the study of Molecular and Cellular Biology. It is one of three core courses required for the MCB major. The focus will be on the fundamental concepts governing the interaction of biological macromolecules required for the central dogma of molecular biology: DNA > RNA > protein. Topics to be
covered: DNA structure, replication, RNA transcription, structure, modification, processing and turnover, protein translation and modification. Non-covalent protein-ligand, protein-protein and protein-nucleic acid interactions required for these processes will be explored in-depth.

In addition to lectures, small group in-class activities will: 1) introduce concepts that are the basis of interaction in large molecular assemblies, 2) introduce molecular and cell biology concepts that put macromolecular assemblies in a biological context.

Learning outcomes:

1. Students will demonstrate understanding of the ways that chemical principles govern the ability of biological molecules to form cellular complexes. They will be able to describe and apply concepts governing the assembly and function of macromolecular assemblies, such as nucleosomes, polymerases, ribosomes and spliceosomes.

2. Students will be able to describe accurately the cellular context within which macromolecules operate, and how evolution drives diversity at the molecular and macromolecular assembly level.

3. Students will be able to recognize important aspects of atomic-level representations of macromolecules and macromolecular assemblies, and understand how structure is related to function.

4. Students will gain understanding of the non-covalent interactions between macromolecules and small molecule or macromolecular ligands, how the strength of interaction changes under a variety of conditions and why, and how affinity between molecules can be measured and used to determine thermodynamic parameters.

5. Students will be able to describe how enzymes accelerate formation/breaking of covalent bonds, how rates of reactions can be measured and compared for speed and efficiency, how rates are related to thermodynamic parameters, and how enzymes can be inhibited and inhibitor effects quantitated.

Required text:

Course Prerequisites or Co-requisites:

Prior completion of Introductory Biology, MCB 181R; Prior completion of first-semester Organic Chemistry, CHEM 241A.

Grading scheme:

There are four grading components to this course: quizzes (pre-class online AND in-class on paper), in-class problem sets, discussion participation, and exams.

Pre-class quizzes: Due prior to most Monday and Wednesday 2 PM class periods, except the days before exams, 10 pts x 23 classes. Scores from top-scoring 19 quizzes will be totaled. Max score = 190.

Before every 2 PM class, there will be assigned reading from the text and/or an online lecture. A short set of quiz questions based on the reading and lecture will be available online in D2L for most MW classes. Acceptance of quiz answers will close in D2L when class begins.

In-class quizzes: On most Friday 2 PM class periods, there will be an in-class quiz. These quizzes will cover the reading and lecture for the day (3 questions) and include two questions based on in-class problem sets from the Monday and Wednesday of the same week. 10 pts x 11 classes. Scores from top-scoring 9 quizzes will be totaled. Max score = 90.

In-class problem sets: Students will work in small groups during 2 PM MWF class periods to solve problems focused on the major concept(s) of the lesson. Every student in attendance will receive 10 participation points/class period for participating. Your name must appear on the collective answer sheet and the TA/preceptor assigned to your group will verify your participation and effort. 10 pts x 36 classes. Top-scoring 30 sessions will be totaled. Max score = 300.

Discussion sections: Fridays at 3 or 4 PM. Points will be given by the instructors for attendance and ACTIVE participation. 15 pts x 14 classes. Top-scoring 11 sessions will be totaled. Max score = 165.

Exams: There will be a total of three 100-point exams: an exam will be given at the end of each multi-week module. Exams 2 and 3 will have 20 points devoted to prior exam material and 80 points on new material.

Exam 1 will be given on Wednesday February 12, 2 PM in Education 211.

Exam 2 will be given on Wednesday March 4, 2 PM in Education 211.

Exam 3 will be given on Wednesday April 8, 2 PM in Education 211.
The **Final Exam** will be given during the assigned time **1:00 AM - 3:00 PM Friday May 8 in Education 211**. The Final Exam will cover the last module (100 points) and include a comprehensive section covering all course material (100 points). Max score on all exams = 500. There are **NO** make-up exams.

**Course grades:** Total possible points: 1245. Grades will be assigned as follows based on total points: A = 90% of total points or higher, B = 80%, C = 70%, D = 60%, E = less than 60%. Points required for each grade may be adjusted at the end of the semester by the professor, but only to a **lower** value. These values will be posted.

**Assessments/bonus points:** There will be two, approximately half-hour, assessments given to measure acquisition of core course concepts. These assessments are required by MCB and the UA. One assessment will be given in the middle of the semester and one before the end of classes. These **bonus points** (20 points/assessment) can be used to enhance your course point total **AFTER grade cutoffs are assigned**, i.e. move grade level up if the total is just below the cutoff. The bonus points are offered as an incentive to try as hard as you can on the assessments.

**Policies:**

**Attendance:**

**Attendance is required.** Attending class is vital to the learning process. As such, attendance is required at all 2 PM MWF classes and afternoon discussion section meetings on Fridays at 3 or 4 PM. Students who miss class due to illness or emergency are required to bring documentation from their healthcare provider or other relevant, professional third parties. Failure to submit third-party documentation will result in unexcused absences.

All holidays or special events observed by organized religions will be honored for those students who show affiliation with that particular religion. Absences pre-approved by the UA Dean of Students (or Dean's designee) will be honored.

See: http://uhap.web.arizona.edu/policy/appointed-personnel/7.04.02

**Tardiness and leaving early may result in loss of attendance points.** If, on occasion, you must arrive a few minutes late, please join your group as quickly and unobtrusively as possible, and join in the day's lesson without disrupting the process.

**Behavior:**

Civil interaction is encouraged at all times between all course students, TA's, and preceptors. Phone/laptop use will be allowed for course-related activity only.
**Grading:**

All exams will be copied before they are returned to students with a grade. If you want to have your exam re-graded, return it to Professor Dieckmann (Exams 1 or 2) or Horton (Exam 3) within **one week** of receiving the graded exam with a **written** explanation of what you want re-graded and why. You may return the paper copy, or you may send a PDF as an attachment to an email. **Do not return your exam to a TA or Preceptor.**

**Individual exam grading will not be discussed in person/verbally in class or outside of class.** The exam will be re-graded by the Professor and returned to the student.

**Student Code of Academic Integrity**

Students are encouraged to share intellectual views and discuss freely the principles and applications of course materials. However, graded work/exercises must be the product of independent effort unless otherwise instructed. Students are expected to adhere to the UA Code of Academic Integrity as described in the UA General Catalog. See: [http://deanofstudents.arizona.edu/academic-integrity/students/academic-integrity](http://deanofstudents.arizona.edu/academic-integrity/students/academic-integrity).

The University Libraries have some excellent tips for avoiding plagiarism available at: [http://www.library.arizona.edu/help/tutorials/plagiarism/index.html](http://www.library.arizona.edu/help/tutorials/plagiarism/index.html).

**Threatening behavior** will not be tolerated as outlined:

[http://policy.web.arizona.edu/threatening-behavior-students](http://policy.web.arizona.edu/threatening-behavior-students)

**Disabled students:**

It is a goal of the University that learning experiences be as accessible as possible. If you anticipate or experience physical or academic barriers based on disability, please let me know immediately so that we can discuss options. You are also welcome to contact Disability Resources (520-621-3268) to establish reasonable accommodations.
Confidentiality of Student Records:

Student records are held confidentially. To see the University’s confidentiality policy, see [http://www.registrar.arizona.edu/ferpa/default.htm](http://www.registrar.arizona.edu/ferpa/default.htm)

Additional Resources for Students:

UA Non-discrimination and Anti-harassment policy: [http://policy.arizona.edu/sites/default/files/Nondiscrimination.pdf](http://policy.arizona.edu/sites/default/files/Nondiscrimination.pdf)

 UA Academic policies and procedures are available at: [http://catalog.arizona.edu/2015-16/policies/aaindex.html](http://catalog.arizona.edu/2015-16/policies/aaindex.html)

Student Assistance and Advocacy information is available at: [http://deanofstudents.arizona.edu/student-assistance/students/student-assistance](http://deanofstudents.arizona.edu/student-assistance/students/student-assistance)

Change to syllabus:

The information contained in the course syllabus, other than the grade and absence policies, may be subject to change with reasonable advance notice, as deemed appropriate by the instructor.